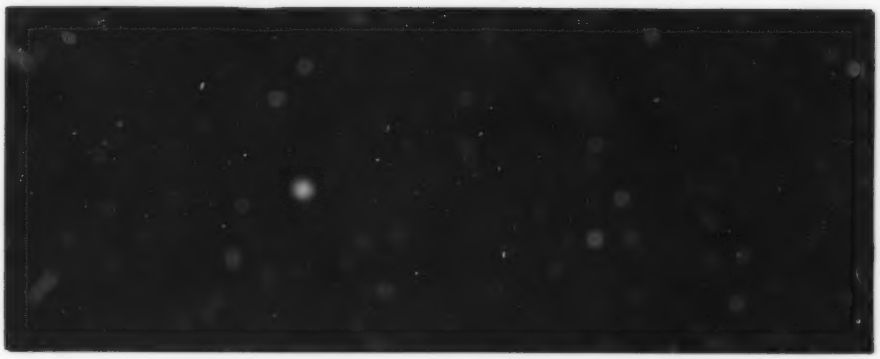
ADF

Saskatchewan Agriculture
Development Fund



Keeping the agriculture and food industries competitive through Research, Development and Demonstration.

Final Report

R-87-05-0227

Regional Spring Grain Variety Testing

Conducted by

F. Holm, S. McColl and D. Benallack

Funded by the Agriculture Development Fund

92-06745/

R-87-05-0227

REGIONAL SPRING GRAIN VARIETY TESTING

FINAL REPORT

(a) EXECUTIVE SUMMARY

1. Abstract

The regional spring grain variety testing program provides unbiased data on the performance of crop varieties and selected experimental lines over a range of soil and climatic conditions in the province. Extensive data from advanced yield trials provides support for registration of new varieties and for entry of lines into preregistration trials. Provincial crop variety recommendations rely on these databases to prepare an annual publication 'Varieties of Grain Crops for Saskatchewan' which is distributed to producers. This program fills an ongoing need for information to serve the agricultural community in making informed choices of crop varieties appropriate to their needs.

2. Summary

The spring grain variety testing program has provided a necessary unbiased database on the performance of various spring grain crop varieties and selected experimental lines over a wide range of soil and climatic conditions in the province. Yield testing of advanced lines from crop breeding programs of the Crop Development Centre has resulted in many cases with registration of new varieties. Other lines have continued into preregistration trials. The Saskatchewan Advisory Council on Grain Crops has used the data generated by this testing program to formulate and update provincial variety recommendations annually. The agricultural community has benefited by the continued introduction of new crop varieties which may have specific attributes suited to their particular cropping district. Producers have a better choice of crop variety which enables them to optimize their economic return. It is only with continued variety testing and advanced line testing that plant breeders are able to generate new crop varieties suitable to the needs of the farmers in the province.

It is difficult to assess how many producers have inspected the variety test sites each year either on their own initiative or in conjunction with an organized crop tour. A conservative estimate of several thousand each year is realistic however. Many farmers like to see new varieties before they try growing them and the feedback from field days has been very positive.

(b) TECHNICAL REPORT

Abstract

Replicated yield trials were established at twelve sites in 1987, and at sixteen sites in 1988 and 1989. Seventy-eight crop varieties were evaluated in 1987, ninety-five in 1988 and one hundred and seventeen in 1989. All sites were harvested unless there was extreme damage due to drought, hail, insects or unexplained field variation. Data collected from the sites has been statistically analyzed, summarized and utilized in keeping with the objectives of the project.

Background and Objectives

Budget cutbacks in Agriculture Canada Research Branch have severely curtailed their variety testing program. The regional spring grain variety testing program was initiated to maintain an adequate database on crop variety performance. The objectives of the project are as follows:

(1) To obtain unbiased data on performance of various spring grain varieties under a wide range of soil and climatic conditions.

(2) To obtain similar data on selected experimental lines which are potential candidates for registration as new crop varieties.

(3) To obtain performance data on advanced lines from the grain breeding programs of the Crop Development Centre. This information can provide support for entry of some lines into preregistration trials and also support data for registration of new varieties.

(4) To obtain performance data from preregistration trials to support registration of experimental lines.

(5) To provide the Saskatchewan Advisory Council on Grain Crops with necessary data for formulating lists of recommended crop varieties for the four crop production areas of the province.

(6) To provide Saskatchewan producers the opportunity to inspect test sites and see recommended crop varieties growing side by side. Organized field days also provide further opportunity for producers to learn more about crop varieties suitable for their local area.

Experimental Methods

Varieties of grain crops (hard red spring wheat, durum wheat, Canada Prairie Spring wheat, utility wheat, triticale, six row barley, two row barley, oat, flax, Argentine canola, Polish canola, field pea, lentil, canary seed and safflower) were yield tested at a number of locations in the province. Twelve sites were included in 1987, sixteen in 1988 and sixteen in 1989. Sites were located in each of the four established grain crop production areas as follows:

Area 1	Assiniboia	Area 3	North Battleford
	Fox Valley		Jedburgh
			Wakaw
Area 2	Alameda		Wynyard
	Elrose		
	Girvin	Area 4	Canora
	Saskatoon		Codette
	Outlook		Kelvington
	Riverhurst		Shellbrook
	Rosetown		

The plots were five rows wide by five meters long and were replicated to allow for statistical analysis of the data. Each test site was fertilized according to soil test results. Weed control was achieved through the use of registered herbicides and hand weeding. Harvesting was done with a self-propelled small-plot combine. Grain yields were corrected for moisture content and statistical analysis carried out on the data. Sites which had unacceptable, unexplained variation were not included in the determination of average yields.

Advanced yield trials of breeders' lines were conducted under this project at four locations: Elrose, Melfort, Goodale and Saskatoon. A list of these tests conducted in the three field seasons 1987-1990 follows:

<u>Elrose</u>

Feed and Malting Barley	Western Cooperative 2 row
	Eastern Prairie Barley Coop
	SBYT 2-6
Bread Wheat	Western Bread Wheat 'B'
	Western Bread Wheat 'C'
	SBWYT 1-2
Durum Wheat	Durum Western 'A' Coop
	Durum Coop
	SDWYT 1-7

<u>Melfort</u>

Feed and Malting Barley	SBYT 2-6
Bread Wheat	SBWYT 1-2
Oat	SOYT 1

Goodale

Feed and Malting Barley	SBYT 2-6
	HB Coop
	HWBYT
Bread Wheat	PBWYT 1-3
	SBWYT 1-3
Utility Wheat	SUWYT 1-4
Triticale	Triticale Coop
	TY5
Oat	SOYT 1
	Rust area coop

Saskatoon (Kernen)

Feed and Malting Barley	SBYT 2-5
	Barley Yield 5 2-row Coop
	Barley Yield 5 6-row Coop
	Western Coop 2-row
	Western Coop 6-row
	Eastern Prairie Barley Coop
	Western Prairie Barley Coop
Feed Barley	PFBYT 1-3
	SBYT 1-6
	HWBYT
	HB Coop
Malting Barley	PMBYT 1-9
Oat	POYT 1
	SOYT 1
	UOYT 1
	Western Coop Oat
	Rust area Coop
Bread Wheat	PBWYT 1-5
	SBWYT 1-3
	Parkland Wheat Coop
	Western Bread Wheat 'B'
	Western Bread Wheat 'C'
	Central Bread Wheat Coop
Durum Wheat	SDWYT 1-7
	Durum Wheat 'B'
	Durum Wheat Coop
Utility and CPS	SUWYT 1-4
	PUWYT 1-4
	HYW 'B' and 'C'

Results from these advanced yield trials are reported in an annual report (1989 annual report is enclosed).

Seed of all barley entries in regional trials (including Agriculture Canada Zonation trials) was grown and provided by this project as our contribution to the network. Additional seed increases of varieties not available from the zonation network were also grown i.e., lentil, fababean and canary seed.

Results and Discussion

Yield data from the regional spring grain variety testing program has been published annually in a technical report [see (c) Publications and Talks]. A summary report providing average grain yields over a number of previous years has also been published annually [see (c)]. These reports have been made available to Extension Agrologists, cooperating farmers, agricultural societies and plant breeders in the province. Performance data from the advanced yield trials (published in Crop Development Centre reports) has provided support for entry of experimental lines into preregistration trials and has also provided support data for registration of new varieties. New variety development is the main goal of plant breeding programs which seek to provide the producer with better choices of crop varieties which are suited to their particular needs in any of the grain crop production areas of the province. During the period 1987-1990 the following experimental lines from plant breeding programs of the Crop Development Centre have been supported for registration as new varieties.

Flax	Barley
FP 846	BT477
FP 855	BT447
FP 859	BT483
	BT492
Oat	TR490
	TR307
OT322	TR479
Durum	Hard Red Spring Wheat
DT606	BW599
	BW606

Lentil

Rose

The Saskatchewan Advisory Council on Grain Crops has made use of the unbiased performance data from both the advanced yield trials and the regional spring grain variety trials in formulating lists of recommended crop varieties for the four grain crop production areas in the province. These recommendations have been published annually in 'Varieties of Grain Crops for Saskatchewan' [see (c)] which is distributed to producers. This publication enables producers to make an informed choice of variety

for their area with regard to yield potential, maturity, lodging and shattering resistance, disease resistance and quality characteristics in some cases. The accumulation of performance data from this project has been crucial to the continued publication and updating of crop variety information in 'Varieties of Grain Crops for Saskatchewan'.

The extension component of this program has been highly successful. The test sites were chosen for maximum visibility on well-travelled roads wherever possible. A large sign identified the test and the cooperators involved. Individual crop varieties were identified with small signs put up near heading time and taken down just before harvest. Copies of a variety list [see (c) extension pamphlets] which included a brief description of each variety were placed in a mailbox installed at each site. Farmers were encouraged to stop and inspect the plots through publicity provided by the cooperating extension agrologist. Reports indicate that many farmers have stopped for a self-guided tour of the plots on their own initiative throughout the growing season.

In addition, extension agrologists were encouraged to organize field days with these variety test sites as part of their crop tours. Plant breeders and extension staff from the University of Saskatchewan and Crop Development Centre were available for talks at these field days [see (c) Publication and Talks]. They highlighted various agronomic, disease and quality characteristics of established varieties and selected experimental lines which would be pertinent to local producers. Field days which had been well organized had good attendance.

Conclusions and Impact

The Regional Testing of Grain Varieties for Saskatchewan has met the objectives set out in the project proposal. Unbiased data has been accumulated on the performance of various spring grain varieties and selected experimental lines over a wide range of soil and climatic conditions in the province. Advanced lines from the crop breeding programs of the Crop Development Centre have been evaluated. This data supported entry of lines into preregistration trials and supported registration of new varieties. New variety development has resulted from the data collected in these testing programs. Data collected has been distributed and used annually by the Saskatchewan Advisory Council on Grain Crops in formulating provincial variety recommendations. This information has been made readily available to producers and extension personnel. It can also be easily accessed from 'Varieties of Grain Crops for Saskatchewan' to make variety choices in the four crop production regions. It would be difficult to estimate economic impact but the choice of an inappropriate variety can have severe consequences for individual farmers. Yield losses due to poor agronomic characteristics, disease or insect susceptibility can be minimized when variety choice is based on repeated cumulative data. Without the information provided by this project it would be very difficult to serve the agricultural community in making reliable choices of crop varieties suited to their needs.

(c) PUBLICATIONS AND TALKS

Technical Reports

Regional Spring Grain Variety Trials 1987	F.A. Holm	25 pp.
Regional Spring Grain Variety Trials 1982-1987	F.A. Holm	34 pp.
Regional Spring Grain Variety Trials 1988	S. McColl & D. Benallack	33 pp.
Regional Spring Grain Variety Trials 1984-1988	S. McColl & D. Benallack	52 pp.
Regional Spring Grain Variety Trials 1989	S. McColl & D. Benallack	47 pp.
Regional Spring Grain Variety Trials 1985-1989	S. McColl & D. Benallack	59 pp.

Extension Publications (data from these trials contributes to recommendations in these publications)

Varieties of Grain Crops for Saskatchewan 1988	8 pp.
Varieties of Grain Crops for Saskatchewan 1989	14 pp.
Varieties of Grain Crops for Saskatchewan 1990	14 pp.

Extension Pamphlets (distributed to producers at field days)

Regional Spring Crop Variety Testing, 1987
Regional Spring Crop Variety Testing, 1988
Regional Spring Crop Variety Testing, 1989

Talks at Summer Field Days

Staff from the University of Saskatchewan and Crop Development Centre were available at producer-oriented field days to highlight the agronomic and quality characteristics of new and older varieties and to indicate the direction of current plant breeding programs. Extension agrologists were instrumental in organizing these talks at the following sites during the 1987-1990 period. The number of field days held at a particular site is indicated in the table.

	1987	1988	1989
Alameda		1	1
Assiniboia		1	
Fox Valley			1
Codette		1	1
Wynyard			1
Kelvington	1	1	1
North Battleford	1	1	1
Wakaw	1	1	1
Outlook		1	1
Riverhurst			1
Saskatoon	1		
Canora	3	2	